Disclosures

- I have no disclosures
Purpose

- FAI from the perspective of the treating Orthopaedic surgeon
- What it is
- Why it's bad
- How I use imaging
- What it looks like on the inside
FAI

- Simple Definition:
  - Abnormal contact between the proximal femur and acetabulum

- 2 types
  - Cam
  - Pincer
  - Combined

- Patterns of damage unique to type
Hip Mechanics

IMPINGEMENT <<SWEET SPOT>> INSTABILITY
Importance

- Majority of “idiopathic” OA due to subtle anatomic abnormalities
- Legg-Calves Perthes
- Slipped Capital Femoral epiphysis
- Developmental dysplasia
- Protrusio Acetabula
- 20 year old healthy male with hip pain?? – FAI?

“Pediatric orthopaedics is preventative orthopedics”

-Dr. Haynes
Etiology of OA of the Hip

- Dysplasia  43%
- Perthes Disease  22%
- Slipped Epiphysis  11%
- Other  12%
  - “Idiopathic”/”Primary”  12%

(Aronson, AAOS ICL Lec. 35:119-128, 1986)
“There is no such thing as primary osteoarthritis of the hip. Or if there is, it must be exceedingly rare”

Dr. William Harris
Mass. General Hospital
Boston
What does FAI look like?
Cam

- Enlarged femoral head-neck junction (decreased offset)
- "Pistol grip"
- Young active males
- Pain with Flexion + IR
  - Also activity related
- Anterior superior labral tears and cartilage delamination

*Ganz
Pincer

- Contact between anterior acetabular rim and normal head-neck junction
- Deep socket - protrusio
- Focal anterior over-coverage
- Acetabular retroversion
- Middle-aged athletic women
- Anterior impingement
- Degenerative labrum
- Contrecoup lesion

*Ganz*
Clinical Presentation

- **History**
  - Anterior groin/thigh pain
  - Worse with flexion
  - Buttock pain
  - “C” sign

- **Exam**
  - Impingement sign
    - 90° flexion +IR+ adduction
Diagnostic Imaging – Imaging guides treatment

- Plain radiographs
  - AP pelvis
    - Coccyx symphysis relationship
  - True (cross table) lateral hip
  - False profile
- MRI arthrogram
  - Hip – NOT PELVIS
  - Double oblique (axial oblique)
  - Radial
- CT scan
  - Femoral and acetabular version
- DGEMRIC
Radiographic Evaluation

- Plain Radiographs
  - Well rotated AP
  - Frog lateral
  - False profile

- Looking for
  - Bony prominence
  - Impingement cysts (herniation pits)
  - Pistol grip femur
  - Arthritic changes
  - Acetabular version (cross over sign and posterior wall sign)
  - Protrusio (ilioischial line)
Well Rotated

Distance from the pubic symphysis to the tip of the coccyx should be 1-3 cm

Obturator foramina should be symmetric in appearance

*Clohisy
Well Rotated
AP Pelvis

- Bony Prominence
- Impingement cyst
- Sacrum & Symphysis alignment
Frog

Impingement cyst
Frog

Decreased offset
False Profile
Crossover sign/Posterior wall sign/Ischial spine sign
MRI

- MRI arthrogram
  - Sphericity of femoral head
  - Head-neck offset ($\alpha$ angle)
  - Impingement cysts
  - Ossification of acetabular rim
  - Labral tears
  - Chondral lesions
Double Oblique MRI

Degenerative Labrum
Radial MRI
DGEMRIC

- Improves my ability to predict successful outcome of surgery based on pre-existing cartilage damage
CT Scan

- Axial slices
  - Acetabular version
  - Femoral version
- 3D reconstruction
Imaging in FAI

- Better understand the anatomy
- Cam or Pincer
- Cam – where is the lesion
- Pincer – focal or global
- Is preservation surgery worthwhile?
- Use this to decide best surgical approach
Nonsurgical Treatment

- Activity modification
  - Avoid passive range of motion exercises
  - PT may cause more damage

- NSAIDS

- Ineffective long term
  - Anatomic deformity
Surgical Treatment Options

Absolutely depends on the nature of the impingement
- Cam
  - Localized
  - Diffuse
- Pincer
  - Anterior over-coverage
  - Acetabular retroversion

Arthroscopy
- Surgical Dislocation
- Anteverting
  Periacetabular osteotomy
Case Examples

- Idiopathic Cam FAI
- Cam FAI due to SCFE
- Focal Pincer FAI
- Pincer FAI due to acetabular retroversion

Presentation

- What imaging studies I order and what I am looking for

Treatment

- How the inside looks compared to pre-op imaging
Idiopathic CAM FAI

- 16 year old male left hip pain while playing soccer
- Positive impingement test
Cam FAI

- What I order
  - AP, frog pelvis
Cam FAI

- **What I order**
  - MRI arthrgram
    - Labral tear?
    - Where is the cam lesion?
    - How extensive is the cam lesion?
    - Is there any acetabular cartilage delamination?
Cam FAI
Cam FAI

- Localized idiopathic appearing Cam lesion
- No labral tear
- Arthroscopic femoral osteochondroplasty
Cam FAI
Cam FAI due to SCFE

- 15 y.o. male previously treated for right SCFE
- Continued right hip pain with walking and sports
- Right hip internal rotation of -30°
- Positive impingement sign
Cam FAI due to SCFE

- What I order
  - AP, frog pelvis
  - No MRI b/c screws

- Treatment – surgical dislocation of the hip
Cam FAI due to SCFE
Cam FAI due to SCFE
Pincer FAI due to focal anterior over-coverage

- 16 y.o. female complains of right hip pain worse with exercise
- Shows “c-sign”
- Positive impingement sign
- What I order
  - AP, frog pelvis, false profile
  - MRI arthrogram
Pincer FAI due to focal anterior over-coverage
Pincer FAI due to focal anterior over-coverage

(*Ganz)
Pincer FAI due to focal anterior over-coverage
Pincer FAI due to acetabular retroversion

- 16 year old male with right hip pain with sitting and activities
- Baseball catcher – can’t play
- What I ordered
  - AP, frog pelvis, false profile
  - 3D CT
Pincer FAI due to acetabular retroversion
Periacetabular osteotomy

*Steppacher*
Anteverting (Reverse) Periacetabular Osteotomy
Thank you

POORMD.COM

...appears to be a possible, borderline, indeterminate, equivocal, suspected pixel, probably of questionable significance. Clinical correlation needed... maybe...